

**Notice of Allowability**

Application No.

09/942,408

Examiner

John Pezzlo

Applicant(s)

FURUKAWA ET AL.

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**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment filed 20 July 2005.
2. ☒ The allowed claim(s) is/are 2-29, 38-62, 70-81, 86-113, 120-122, 125-127 (renumbered 1-99).
3. ☒ The drawings filed on 29 August 2001 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).


\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date 6/15/05, 7/15/04, 26 May 04
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

  
**JOHN PEZZLO**  
**PRIMARY EXAMINER**

## **DETAILED ACTION**

### ***Allowable Subject Matter***

Claims 2-29, 38-62, 70-81, 86-113, 120-122, and 125-127 are allowable over the prior art of record.

### ***Reasons for Allowance***

The following is an examiner's statement of reasons for allowance: Applicants have claimed the following uniquely distinct features in the instant invention, which are not found in the prior art, either singularly or in combination:

1. Regarding claim 2 - A radio network comprising: at least one core node connected to a wired network, relay nodes, each of the relay nodes relaying at least one of a down-link data packet transmitted from the core node and an up-link data packet directed toward the core node, a terminal station transmitting and receiving at least one data packet to/from the core node and at least one relay node, the at least one relay node relaying the up-link data packet to at least one other up-link relay node and the core node when the up-link data packet addressed to an own node is received, and relaying a down-link data packet to at least one down-link relay node when the down-link data packet address to the own node is received. wherein the at least one core node transmits a route setting packet, said route setting packet includes: sender node identification information,

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an up-link receiver side relay node, and a metric indicative of an amount providing criteria for selecting the up-link receiver side node.

2. Regarding claim 11 - A radio network comprising: a relay node which forgets all update metrics corresponding to route setting packets received in the past when a sender node identification information contained in a currently received route setting packet matches a current up-link receiver side relay node of own node, the relay node relays a new route setting packet comprising the update metric corresponding to the currently received route setting packet as a new metric.

3. Regarding claim 38 - A relay node relaying at least one of a down-link data packet initially transmitted from a core node and an up-link data packet directed toward the core node, and capable of communication with a terminal station, relaying the up-link data packet to one of an up-link relay node and the core node when the up-link data packet addressed to an own node is received and relaying a down-link data packet to at least one down-link relay node when the down-link data packet address to the own node is received, wherein a route setting packet includes a sender node identification information, an up-link receiver side relay node and a metric indicative of an amount providing criteria for selecting the up-link receiver side node from at least one of the core node and an other relay node.

4. Regarding claim 70 - A core node connected to a wired network, being relayed at least one of a down-link data packet transmitted from an own node and an up-link data packet directed toward own node, and capable of transmission and reception of a data packet with a terminal station, and transmitting a route setting packet including a metric indicative of an amount providing criteria for selecting an up-link receiver side relay

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node, an up-link receiver side relay node information and a sender node identification information to the relay node.

5. Regarding claim 86 - A relaying method for a radio network including a core node connected to a wired network, relay nodes each relaying at least one of a down-link data packet transmitted from the core node and an up-link data packet directed toward the core node, and a terminal station capable of transmission and reception of a data packet with both of the core node and the relay node, comprising step of relaying the up-link data packet to other one of up-link relay node and the core node when the up-link data packet addressed to own node is received and relaying a down-link data packet to at least one down-link relay node when the down-link data packet address to the own node is received, wherein the core node transmits a route setting packet including a sender node identification information, an up-link receiver side relay node and a metric indicative of an amount providing an indicia for selecting the receiver side node.

6. Regarding claim 95 - A relaying method comprising: a relay node which forgets all of update metrics corresponding to route setting packets received in the past and relays a new route setting packet taking the update metric corresponding to the currently received route setting packet as a new metric, when a sender node identification information contained in a received route setting packet matches a current up-link receiver side relay node.

7. Regarding claim 120 - A relaying method for a radio network including at least one core node connected to a wired network, relay nodes each relaying at least one of a down-link data packet initially transmitted from the at least one core node and an up-link data packet directed toward the at least one core node, and a terminal station capable of

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transmission and reception of data packet with both of the at least one core node and the relay nodes, comprising: step of detecting arrival of a route setting packet including a sender node identification information, an up-link receiver side relay node information and a metric indicative of an amount providing criteria for selecting an up-link receiver side relay node, step of making judgment whether the up-link receiver side relay node indicates own node or not upon detection of arrival of the route setting packet, step of recording a node indicated by the sender node identification information contained in the route setting packet in a relay node list when judgment is made that the up-link receiver side information indicates own node, step of taking a measured path loss upon judgment that the up-link receiver side node relay node information does not indicate own node, as path loss  $L_n$  ( $n$  is unique number of a sender node of the route setting packet) between the node transmitting the route setting packet and the own node, step of reading the metric  $M_{r,n}$  contained in the route setting packet, step of calculating and storing an update metric from the path loss  $L_n$  and the metric  $M_{r,n}$ , step of comparing the update metric  $M_n$  with the update metric corresponding to the route setting packet received in the past for making judgment whether the update metric  $M_n$  is minimum, step of setting the update metric  $M_n$  to a metric field contained in a new route setting packet and registering the node indicated by the sender node identification information of the currently arrived route setting packet as the up-link receiver side relay node of own node when the update metric  $M_n$  is judged as minimum, and step of transmitting the new route setting packet containing the metric  $M_n$  as a new metric  $M$ , sender node identification information indicating identification information of own node and the up-link receiver side relay node information.

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8. Regarding claim 121 - A relaying method for a radio network including at least one core node connected to a wired network, relay nodes each relaying at least one of a down-link data packet initially transmitted from the at least one core node and an up-link data packet directed toward the at least one core node, and a terminal station capable of transmission and reception of data packet with both of the at least one core node and the relay nodes, comprising: step of detecting arrival of a route setting packet including a sender node identification information, an up-link receiver side relay node information and a metric indicative of an amount providing criteria for selecting the up-link receiver side relay node, step of making judgment whether the up-link receiver side relay node indicates own node or not upon detection of arrival of the route setting packet, step of recording a node indicated by the sender node identification information contained in the route setting packet in a relay node list when judgment is made that the up-link receiver side information indicates own node, step of taking a measured path loss upon judgment that the up-link receiver side node relay node information does not indicate own node, as path loss  $L_n$  ( $n$  is unique number of a sender node of the route setting packet) between the node transmitting the route setting packet and the own node, step of reading the metric  $M_{r,n}$  contained in the route setting packet, step of calculating and storing an update metric from the path loss  $L_n$  and the metric  $M_{r,n}$ , step of making judgment whether the sender node identification information contained in the currently received route setting packet matches with the current up-link receiver side relay node of the own node or not, step of forgetting all stored update metrics when the sender node identification information contained in the currently received route setting packet matches with the current up-link receiver side relay node of the own node, identification

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information contained in the currently received route setting packet does not match with the current up-link receiver side relay node of the own node, step of setting the update metric  $M_n$  to a metric contained in a new route setting packet and registering the node indicated by the sender node identification information of the currently arrived route setting packet as the up-link receiver side relay node of the own node when all of the update metrics are forgotten or when the update metric  $M_n$  is judged as minimum, and step of transmitting the new route setting packet containing the metric  $M_n$  as a new metric  $M$ , sender node identification information indicating identification information of the own node and the up-link receiver side relay node information.

9. Regarding claim 122 - A relaying method for a radio network including at least one core node connected to a wired network, relay nodes each relaying at least one of a down-link data packet initially transmitted from the at least one core node and an up-link data packet directed toward the at least one core node, and a terminal station capable of transmission and reception of a data packet with both of the at least one core node and the relay nodes, comprising: step of detecting arrival of a route setting packet including a sender node identification information, an up-link receiver side relay node information and a metric indicative of an amount providing criteria for selecting an up-link receiver side relay node, step of making judgment whether the up-link receiver side relay node indicates own node or not upon detection of arrival of the route setting packet, step of recording a node indicated by the sender node identification information contained in the route setting packet in a relay node list when judgment is made that the up-link receiver side information indicates own node, step of taking a measured path loss upon judgment that the up-link receiver side node relay node information does not indicate own node, as

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path loss  $L_n$  ( $n$  is unique number of a sender node of the route setting packet) between the node transmitting the route setting packet and the own node, step of reading the metric  $M_{r,n}$  contained in the route setting packet, step of calculating and storing an update metric from the path loss  $L_n$  and the metric  $M_{r,n}$ , step of comparing the update metric  $M_n$  with the update metric corresponding to the route setting packet received in the past for determining a sender node  $m$ ,  $m$  is a unique node number, having a minimum metric, step of making judgment whether the sender node  $m$  is the same as the current up-link receiver side relay node of own node and  $n \neq m$ ; step of setting the update metric  $M_n$  to a metric field contained in a new route setting packet and registering the node indicated by the sender node  $m$  as the up-link receiver side relay node of own node when the sender node  $m$  is not the same as the current up-link receiver side relay node of own node,  $n = m$ , and step of transmitting the new route setting packet containing the metric  $M_n$  as a new metric  $M$ , sender node identification information indicating identification information of own node and the up-link receiver side relay node information of own node.

10. Regarding claim 125 - A program of a relaying method for a radio network including a core node connected to a wired network, relay nodes each relaying at least one of a down-link data packet transmitted from the core node and an up-link data packet directed toward the core node, and a terminal station capable of transmission and reception of data packet with both of the core node and the relay node, the program being executed by a computer for implementing the step of: step of detecting arrival of a route setting packet including a sender node identification information, an up-link receiver side relay node information and a metric indicative of an amount providing an indicia for



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selecting the receiver side relay node; step of making judgment whether the up-link receiver side relay node indicates own node upon detection of arrival of the route setting packet; step of recording a node indicated by the sender node identification information contained in the route setting packet in a relay node list when judgment is made that the up-link receiver side information indicates the own node, step of taking a measured path loss upon judgment that the up-link receiver side node relay node information does not indicate own node, as path loss  $L_n$ , is unique number of a sender node of the route setting packet, between the node transmitting the route setting packet and the own node, step of reading the metric  $M_{r,n}$  contained in the route setting packet, step of calculating and storing an update metric from the transmission loss  $L_n$  and the metric  $M_{r,n}$ , step of comparing the update metric  $M_n$  with the update metric corresponding to the route setting packet received in the past for making judgment whether the update metric  $M_n$  is minimum, step of setting the update metric  $M_n$  to a metric contained in the metric of the route setting packet and registering the node indicated by the sender node identification information of the currently arrived route setting packet as the up-link receiver side relay node when the update metric  $M_n$  is judged as minimum, and step of transmitting a route setting packet containing the transmission metric  $M$  as the metric, sender node identification information indicating identification information of own node and the up-link receiver side relay node information.

11. Regarding claim 126 - A program of a relaying method for a radio network including a core node connected to a wired network, relay nodes each relaying at least one of a down-link data packet transmitted from the core node and an up-link data packet directed toward the core node, and a terminal station capable of transmission and

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reception of data packet with both of the core node and the relay node, the program being executed by a computer for implementing the step of: step of detecting arrival of a route setting packet including a sender node identification information, an up-link receiver side relay node information and a metric indicative of an amount providing an indicia for selecting the receiver side relay node, step of making judgment whether the up-link receiver side relay node indicates own node upon detection of arrival of the route setting packet, step of recording a node indicated by the sender node identification information contained in the route setting packet in a relay node list when judgment is made that the up-link receiver side information indicates the own node, step of taking a measured path loss upon judgment that the up-link receiver side node relay node information does not indicative own node, as path loss  $L_n$ , is unique number of a sender node of the route setting packet, between the node transmitting the route setting packet and the own node; step of reading the metric  $M_{r,n}$  contained in the route setting packet, step of calculating and storing an update metric from the transmission loss  $L_n$  and the metric  $M_{r,n}$ , step of making judgment whether the sender node identification information contained in the currently received route setting packet matches with the current up-link receiver side relay node information or not, step of forgetting all stored update metrics when the sender node identification information contained in the currently received route setting packet matches with the current up-link receiver side relay node information, step of comparing the update metric corresponding to the route setting packet received in the past and the currently obtained update metric  $M_n$  when the sender node identification information contained in the currently received route setting packet does not match with the current up-link receiver side relay node information, step of setting the update metric  $M_n$  to a

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metric contained in the metric of the route setting packet and registering the node indicated by the sender node identification information of the currently arrived route setting packet as the up-link receiver side relay node when all of the update metrics are forgotten or when the update metric  $M_n$  is judged as minimum, and step of transmitting a route setting packet containing the transmission metric  $M$  as the metric, sender node identification information indicating identification information of own node and the up-link receiver side relay node information.

12. Regarding claim 127 - A program of a relaying method for a radio network including at least one core node connected to a wired network, relay nodes each relaying at least one of a down-link data packet transmitted from the at least one core node and an up-link data packet directed toward the at least one core node, and a terminal station capable of transmission and reception of data packet with both of the core node and the relay node, the program being executed by a computer for implementing the step of: step of detecting arrival of a route setting packet including a sender node identification information, an up-link receiver side relay node information and a metric indicative of an amount providing an indicia for selecting the receiver side relay node, step of making judgment whether the up-link receiver side relay node indicates own node upon detection of arrival of the route setting packet, step of recording a node indicated by the sender node identification information contained in the route setting packet in a relay node list when judgment is made that the up-link receiver side information indicates the own node, step of taking a measured path loss upon judgment that the up-link receiver side node relay node information does not indicate own node, as path loss  $L_n$ ,  $n$  is unique number of a sender node of the route setting packet, between the node transmitting the

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route setting packet and the own node, step of reading the metric  $M_{r,n}$  contained in the route setting packet, step of calculating and storing an update metric from the transmission loss  $L_n$  and the metric  $M_{r,n}$ , step of comparing the update metric  $M_n$  with the update metric corresponding to the route setting packet received in the past for determining a sender node  $m$  ( $m$  is unique number of node) having minimum metric, step of making judgment whether the sender node  $m$  is the same as the current up-link receiver side relay node and  $n \neq m$ , step of setting the update metric  $M_n$  to a metric contained in the metric of the route setting packet and registering the node indicated by the sender node  $m$  as the up-link receiver side relay node when the sender node  $m$  is not the same as the current up-link receiver side relay node or  $n = m$ , and step of transmitting a route setting packet containing the transmission metric  $M$  as the metric, sender node identification information indicating identification information of own node and the up-link receiver side relay node information.

The closest prior art, either singularly or in combination, fail to anticipate or render the above limitations obvious.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

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Claims 2-29, 38-62, 70-81, 86-113, 120-122, and 125-127 being allowable,

**Prosecution On The Merits Is Closed** in this application.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

1. Garcia-Luna-Aceves et al. (US 2003/0037167 A1) discloses a unified routing scheme for ad-hoc internetworking.
2. Pankaj (US 6,393,012 B1) discloses a system for allocating resources in a communication system.
3. Toh (US 5,987,011) discloses routing method for ad-hoc mobile networks.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Pezzlo whose telephone number is (571) 272-3090. The examiner can normally be reached on Monday to Friday from 8:30 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou, can be reached on (571) 272-3088. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-2600.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C.

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or faxed to:

(703) 872-9306

For informal or draft communications, please label "PROPOSED" or "DRAFT"

Hand delivered responses should be brought to:


Jefferson Building

500 Dulany Street

Alexandria, VA.

John Pezzlo

4 August 2005



**JOHN PEZZLO**  
**PRIMARY EXAMINER**